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Kathy Manke Avago Technologies Limited 4380 Ziegler Road Fort Collins, CO 80525			EXAMINER PAYNE, SHARON E	
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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* LEE KONG WENG, NG KEE YEAN, and LEE MENG EE

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Appeal 2009-002980  
Application 10/669,986<sup>1</sup>  
Technology Center 2800

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Decided: March 12, 2010

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Before KENNETH W. HAIRSTON, MARC S. HOFF, and THOMAS S.  
HAHN, *Administrative Patent Judges*.

HOFF, *Administrative Patent Judge*.

DECISION ON APPEAL

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<sup>1</sup> The real party in interest is Avago Technologies ECBU IP (Singapore) PTE., Ltd.

## STATEMENT OF CASE

Appellant appeals under 35 U.S.C. § 134(a) from a Final Rejection of claims 1 and 3-14.<sup>2</sup> We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

Appellant's invention relates to a standalone light emitting diode package. A ceramic cavity encloses a substrate for mounting a light emitting diode, with vertical sidewalls to reduce light leakage. A metallic coating is included on a portion of the ceramic substrate for reflecting light in a predetermined direction (Spec. 3).

Claim 1 is exemplary of the claims on appeal:

1. A standalone light emitting diode package, comprising:
  - a housing comprising substantially vertical sidewalls and a substrate, the sidewalls and the substrate defining a cavity having a bottom, the substrate being located at the bottom of the cavity, the substrate and the vertical sidewalls being contiguous, continuous and uninterrupted respecting one another at the intersections thereof, the housing forming a single unitary piece of ceramic;
  - at least one light-reflective metallic coating disposed over at least portions of the sidewalls and the substrate;
  - a light emitting diode mounted on or in the substrate, and an optically transparent material disposed in the cavity and covering the light emitting diode;
  - wherein the ceramic composition and configuration of the housing and the light-reflective coating cooperate to minimize light leakage through, into or out of the housing when the light emitting diode is energized, the metallic coating reflects light incident thereon in a predetermined direction, and the optically transparent material protects the light emitting diode.

The Examiner relies upon the following prior art in rejecting the claims on appeal:

Curtin

US 5,686,790

Nov. 11, 1997

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<sup>2</sup> Claims 2 and 15-19 have been cancelled.

Zou	US 6,186,649 B1	Feb. 13, 2001
Ishinaga	US 6,355,946 B1	Mar. 12, 2002
Huang	US 6,715,901 B2	Apr. 6, 2004
Kyocera	JP 2002-232017	Aug. 16, 2002

Merriam-Webster's Collegiate Dictionary, 10<sup>th</sup> Ed., p. 1288

Claims 1, 3, 5, 6, 8, 9, 11, 12, and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishinaga in view of Kyocera and Curtin.

Claims 4 and 10 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishinaga in view of Kyocera, Curtin, and Zou.

Claims 7 and 13 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishinaga in view of Kyocera, Curtin, and Huang.

Throughout this decision, we make reference to the Appeal Brief ("App. Br.," filed October 4, 2007), the Reply Brief ("Reply Br.," filed February 29, 2008) and the Examiner's Answer ("Ans.," mailed December 31, 2007) for their respective details.

## ISSUE

Appellants argue that the Examiner erred in rejecting the claims because none of Ishinaga, Kyocera, and Curtin teaches a standalone light emitting diode package: (a) in which the substrate and vertical sidewalls are contiguous, continuous and uninterrupted; (b) having a housing forming a single unitary piece of ceramic; (c) having at least one light-reflective metallic coating disposed over at least portions of the sidewalls and the substrate; and (d) wherein the ceramic composition and configuration of the housing and light-reflective coating cooperate to minimize light leakage

through, into or out of the housing when the light emitting diode is energized (App. Br. 44).

Appellants' contentions present us with the following issue:

Does the cited combination of Ishinaga, Kyocera, and Curtin teach or suggest a standalone light emitting diode package comprising a housing forming a single unitary piece of ceramic?

### FINDINGS OF FACT

The following Findings of Fact (FF) are shown by a preponderance of the evidence.

#### *The Invention*

1. According to Appellants, the invention concerns packaging for light emitting diodes. The inventive package comprises a ceramic cavity with substantially vertical sidewalls to reduce light leakage. The package further includes a metallic coating on a portion of the ceramic substrate for reflecting light in a predetermined direction (Spec. 3).

#### *Ishinaga*

2. Ishinaga teaches a semiconductor device including a substrate, a semiconductor chip for emitting light, and a reflector enclosing the semiconductor chip for reflecting the light emitted from the semiconductor chip (Abstract).

#### *Kyocera*

3. Kyocera teaches a ceramic package composed of ceramic substrate 31, and roughly square bar-shaped ceramic sash 33 provided with a through hole 33a, laminated on the top surface of ceramic substrate 31 (Fig. 4; ¶ 0003).

*Curtin*

4. Curtin is directed to the use of a multilayer co-fired ceramic substrate as the backplate of a flat panel device such as a flat panel display (col. 1, ll. 21-26).

5. Curtin discusses the applicability of his invention to various display technologies – flat CRT, thin film electroluminescent (TFEL), plasma, vacuum fluorescent (VFD), and liquid crystal displays (LCD) – but does not disclose LED displays as an option or embodiment (col. 1, ll. 32-39; col. 7, ll. 50-55).

6. Ceramic backplate 701 (Fig. 7) is disclosed as being formed of a plurality of ceramic layers that are laminated together (col. 24, ll. 13-15).

*Zou*

7. Zou teaches a linear illumination source having an external, highly reflective enclosure (Abstract).

*Huang*

8. Huang teaches an image projector system whose light source includes a rectangular housing formed with a light-transmissive output port and at least four light-transmissive input ports, at least four light emitting diode modules, and a mirror set mounted in the housing for directing light beam outputs of the light emitting diode modules (Abstract).

PRINCIPLES OF LAW

On the issue of obviousness, the Supreme Court has stated that “the obviousness analysis cannot be confined by a formalistic conception of the words teaching, suggestion, and motivation.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007). Further, the Court stated “[t]he combination of

familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.” *Id.* at 416. “One of the ways in which a patent’s subject matter can be proved obvious is by noting that there existed at the time of the invention a known problem for which there was an obvious solution encompassed by the patent’s claims.” *Id.* at 419-420.

## ANALYSIS

### CLAIMS 1, 3, 5, 6, 8, 9, 11, 12, AND 14

Independent claim 1 recites a standalone light emitting diode package comprising a housing with substantially vertical sidewalls and a substrate, the housing forming a single unitary piece of ceramic. Independent claim 8 is directed to a method of making a standalone light emitting diode package that comprises a housing with substantially vertical sidewalls and a substrate, the housing forming a single unitary piece of ceramic.

The Examiner concedes that Ishinaga does not disclose a housing forming a single unitary piece of ceramic (Ans. 3). The Examiner finds that Kyocera discloses substantially vertical sidewalls being formed of ceramic (Ans. 4), and further finds that Curtin discloses a housing forming a single unitary piece of ceramic (Ans. 4).

We do not agree with the Examiner’s findings concerning the Kyocera and Curtin references. While we agree with the Examiner that Kyocera’s Figure 4 does illustrate substantially vertical sidewalls, we do not agree that Kyocera discloses a housing forming a single unitary piece of ceramic.

Figure 4 of Kyocera is reproduced below.

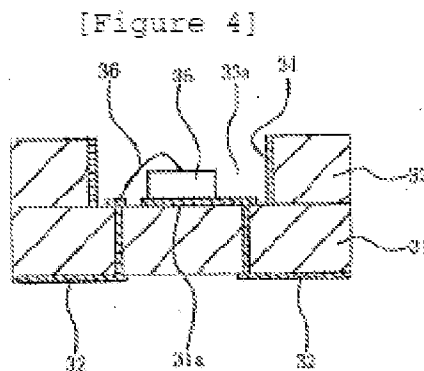


Figure 4 of Kyocera is a sectional view of the conventional [ceramic] package used to contain the light-emitting element (35).

Kyocera teaches that its ceramic package is composed of ceramic substrate 31, and roughly square bar-shaped ceramic sash 33 provided with a through hole 33a, laminated on the top surface of ceramic substrate 31 (FF 3). It is clear from the multiple parts and through hole that Kyocera's ceramic package does not form a single unitary piece of ceramic.

Curtin is directed to the use of a multilayer co-fired ceramic substrate as the backplate of a flat panel device such as a flat panel display (FF 4). While the Examiner is correct that Curtin discloses substantially vertical sidewalls (see Fig. 7) and a housing made of ceramic (Ans. 4; FF 4), we agree with Appellants that Curtin's disclosure is not germane to the claimed invention (App. Br. 42). Curtin's disclosure is not directed to light emitting diode packages whatsoever, but rather to flat panel display backplates. Further, Curtin discusses the applicability of his invention to various display technologies – flat CRT, thin film electroluminescent (TFEL), plasma, vacuum fluorescent (VFD), and liquid crystal displays (LCD) – but does not disclose LED displays as an option or embodiment (FF 5). Finally, even if



one assumes *arguendo* that Curtin *does* disclose light emitting diode packaging, the ceramic backplate of Curtin relied upon by the Examiner does not form a single unitary piece of ceramic. Ceramic backplate 701 (Fig. 7) is disclosed as being formed of a plurality of ceramic layers that are laminated together (FF 6). Because Curtin discloses the presence of a plurality of ceramic layers, the backplate of Curtin does not “form a single unitary piece of ceramic,” as the claims require.

Because neither Ishinaga, Kyocera, nor Curtin teaches or suggests a standalone light emitting diode package having a housing forming a single unitary piece of ceramic, we find error in the Examiner’s rejection of claims 1, 3, 5, 6, 8, 9, 11, 12, and 14 under § 103, and we will not sustain the rejection.

#### CLAIMS 4 AND 10

As explained *supra*, we reverse the rejection of claims 1 and 8 from which claims 4 and 10 respectively depend. The Zou reference does not remedy the deficiency noted with respect to the combination of Ishinaga, Kyocera, and Curtin (i.e., a light emitting diode housing forming a single unitary piece of ceramic). Therefore, we will not sustain the rejection of claims 4 and 10 under § 103, for the same reasons expressed with respect to parent claims 1 and 8, *supra*.

#### CLAIMS 7 AND 13

As explained *supra*, we reverse the rejection of claims 1 and 8 from which claims 7 and 13 respectively depend. The Huang reference does not remedy the deficiency noted with respect to the combination of Ishinaga, Kyocera, and Curtin (i.e., a light emitting diode housing forming a single unitary piece of ceramic). Therefore, we will not sustain the rejection of

claims 7 and 13 under § 103, for the same reasons expressed with respect to parent claims 1 and 8, *supra*.

### CONCLUSION

The cited combination of Ishinaga, Kyocera, and Curtin does not teach or suggest a standalone light emitting diode package comprising a housing forming a single unitary piece of ceramic.

### ORDER

The Examiner's rejection of claims 1 and 3-14 is reversed.

Appeal 2009-002980  
Application 10/669,986

REVERSED

ELD

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